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Procedia Economics and Finance 23 (2015) 77 – 85

Procedia Economics and Finance

www.elsevier.com/locate/procedia

2nd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and TOURISM, 30-31 October 2014, Prague, Czech Republic

An Econometric Analysis of Gold Prices in Turkey

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Abstract

This study aims to identify the factors that affect gold prices on the Turkish Gold Exchange. To that end, London Bullion Market Association's gold prices, Brent oil prices, the US dollar, the American Dow Jones Industrial Index, Wholesale Price Index, Istanbul Stock Exchange 100 Index, and monthly average time deposit interest rates were selected as the factors with possible impact on gold prices; and relevant econometric models were constructed. In the model that delivered the best results among all the models estimated by using the Engle-Granger two-step estimation procedure, London Bullion Market Association's gold prices were found to be the single and most important variable that influences the gold prices on the Istanbul Gold Exchange. Estimation of the gold prices on the Istanbul Gold Exchange in the study was done by using ARCH models. The analysis results revealed that the EGARCH(1,1) model is the best model. Using this model, it was concluded that gold prices on the Istanbul Gold Exchange are negatively influenced by the Dow Jones Industrial Index, positively influenced by London Bullion Market Association's gold prices, also positively influenced by the Wholesale Price Index, and negatively influenced by the volatility of the gold prices on the Istanbul Gold Exchange, which was estimated using ARCH models

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Keywords: Istanbul Gold Exchange, Engle-Granger Two-Step Estimation Procedure, Vector Autoregressive Conditional Heteroscedasticity, Gold Prices, Volatility in the Gold Market

1. Introduction

Gold is strategically important since it maintains its purchasing power in all circumstances; is globally accepted as a store of value; is reliable in politically and economically uncertain environments; and is in close relation with the

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Selection and/ peer-review under responsibility of Academic World Research and Education Center
doi:10.1016/S2212-5671(15)00332-9

returns on all investment instruments. Due to this strategic importance of gold and the fact that it is regarded as a significant store of value for official purposes, gold has become a major element of international reserve assets for countries.

Enjoying a special place among all precious metals, gold has been used for years not only as a jewel, but also as a reserve instrument and a medium of exchange. It formed the basis of the monetary system between 1870-1930 and was a reserve instrument that was fully convertible to US dollar in the 1944-1973 period. In the early 1970s, convertibility of dollar to gold was ended, after which gold was abandoned as a reserve instrument and came to be used as an individual saving instrument and a part of central bank reserves. During the 1980s and 1990s, gold lost its attraction as an investment instrument in rapidly evolving financial markets and in the 2000s, it started to attract the attention of investors again in an environment of observed uncertainty with the turmoil in financial markets. Gold is one of the most preferred investment instruments during economic and political crises since it can be easily converted into cash and its returns move in an opposite direction to those of securities.

Development of the gold market in Turkey could be analyzed in four stages: the historical process starting in the pre-1980 period when there was a ban on gold import; the Market for Gold in Exchange for Turkish Lira founded by the Central Bank of Turkish Republic and ; the Market for Gold in Exchange for Foreign Currency founded in 1989, the Istanbul Gold Exchange founded in 1995; and the process finally ended with the merger of Istanbul Gold Exchange with Borsa Istanbul's Precious Metals and Diamond Market.

Since the day it was founded, the Istanbul Gold Exchange has provided Turkish finance sector with a lot of benefits, the chief of which being the official acceptance of gold import and domestic prices becoming parallel to international prices, prevention of illegal entry of gold into the country, advance of jewelry as a profession, facilitation of importing gold, gathering the gold market under a single roof, and a higher level of quality and reliability achieved for gold investment. Moreover, the founding of Istanbul Gold Refinery has been complementary to the positive developments in the Istanbul Gold Exchange.

Prices in a gold market are determined by the factors that influence supply and demand. In addition to economic factors, wars that affect gold supply and demand and political and social developments such as major terror events and revolutions also play a significant part in the formation of prices.

The present study aims to determine the factors that influence gold prices in the Turkish Gold Exchange. For this purpose, London Bullion Market Association's gold prices, Brent oil prices, the US dollar, the American Dow Jones Industrial Index, monthly average time deposit interest rates, Wholesale Price Index, and Istanbul Stock Exchange 100 Index were selected as the variables with possible influence on gold prices. 1996:01-2012:12 monthly data were used for the variables. The period under study is important in that it was a time of a global crisis when there were record increases in gold prices.

The study is divided into three sections. The first section provides information about the autoregressive conditional heteroscedasticity (ARCH) model, the generalized autoregressive conditional heteroscedasticity (GARCH) model, and exponential generalized autoregressive conditional heteroscedasticity (EGARCH) model. In the second section, the factors that influence gold prices in Turkey were determined and relevant macro economic models are constructed and estimated using the Engle-Granger two-step estimation method. Furthermore, ARCH, GARCH, EGARCH models were tested to obtain the volatility of the monthly return rate for the gold prices in the Istanbul Gold Exchange. The final section interprets the analysis results and provides suggestions.

2. Conditional Heteroscedasticity Models

Volatility in financial markets could be defined as the uncertainty and excessive fluctuations in the price levels in financial markets, chiefly in exchange rates, gold prices, interest rates, and stock prices due to economic and political uncertainties or global factors (Adlığ, 2009: 3).

New methods are proposed to gain a better understanding of the dynamic quality of financial markets and to estimate time-varying volatility. The first of these methods is the autoregressive conditional heteroscedasticity (ARCH) model proposed by Engle (1982). After its proposal by Engle, different variations of the ARCH model were developed. One of these is the generalized (GARCH) model developed by Bollerslev (1986), which has a wide range of practical applications and used for measuring uncertainty. Another model was the (EGARCH) model developed by Nelson (1991).

The ARCH method developed by Engle (1982) basically argues that the variance of the error term in period t is a function of the squares of the previous time periods' error terms (Harvey 1991: 220).

The ARCH (p) model could be written as

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \varepsilon_{t-2}^2 + \cdots + \alpha_p \varepsilon_{t-p}^2 \quad (1)$$

In ARCH (p) model, conditional variance of the error term is an increasing function of the absolute value of the sizes of the error terms in previous periods. Therefore, large errors of either sign tend to be followed by large signs, and similarly, small errors of either sign tend to be followed by small errors. Bollerslev (1986), GARCH (p,q) model could be written as

$$h_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i h_{t-i} \quad (2)$$

The following constraints need to be fulfilled for the validity of GARCH(p,q) model.

$p \geq 0$, $q > 0$, $\alpha_0 > 0$, $\alpha_i \geq 0$ i=1,2,…p, $\beta_j \geq 0$ j=1,2,…q

Unconditional variance of ε_t requires that constraint $\sum_{i=1}^{p} \alpha_i + \sum_{j=1}^{q} \beta_j < 1$ applies. Otherwise, unconditional variance goes to infinity (Enders, 2004:119).

Nelson (1991) developed the EGARCH model, in which conditional variance was modeled by taking into account both the sizes and signs of lagged error terms and the asymmetry in the volatility structure. A first-order EGARCH(1,1) model could be written as follows:

$$\ln h_t = \alpha_0 + \delta_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \gamma_1 \left(\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + \beta_1 \ln(h_{t-1}) \quad (3)$$

3. Identification of the Factors That Influence Gold Prices in Turkey

This study aims to identify the factors that influenced the gold prices in Turkey between January 1996 and December 2012. For this purpose, the weighted average price in US dollars of 1 ounce of gold in the Istanbul Gold Exchange was taken as the dependent variable. The independent variables selected are Brent oil prices, the US dollar, the American Dow Jones Industrial Index, monthly average time deposit interest rates, Wholesale Price Index, Istanbul Stock Exchange 100 Index, and London Bullion Market Association's gold prices.

Since all variables are of different types, their natural logarithms were taken to eliminate the effects of extreme values. The models were calculated in US dollars because dollar/ounce is an accepted criterion in determining gold prices and other variables are also based on the dollar. All data concerning the gold prices in the Istanbul Gold Exchange, the US dollar, monthly average time deposit interest rates, Wholesale Price Index, Istanbul Stock Exchange 100 Index, and London Bullion Market Association's gold prices were obtained from the website of the Central Bank of Turkish Republic, while the statistical data were obtained through the (EVDS). The data about Brent oil prices and the American Dow Jones Industrial Index were taken from the resources of Reuters News Agency. Eviews 6.1 software was used for data analysis. The following is an explanation of the reasons for selecting the variables used in this study.

LIST (Istanbul Gold Exchange Weighted Average Gold Price): Weighted average price in US dollars of 1 ounce of gold in the İstanbul Gold Exchange, or newly called Borsa Istanbul's Precious Metals and Diamond Market. This dataset was preferred since weighted average prices reflect the changes in market movements better than closing prices.

USD (US Dollar): We used the US dollar in our model as gold prices have been kept more or less stable globally in dollars in the post-World War II period through the Bretton Woods system (Vural, 2003: 72). A negative correlation is expected between gold prices and US dollar.

DJ (Dow Jones Industrial Index): We used the American Dow Jones Industrial Index in our model since the New York Stock Exchange is globally recognized and the fixed gold price is calculated in US dollars.

R (Monthly Average Time Deposit Interest Rates): The monthly average time deposit interest rates published by the Central Bank of Turkish Republic were used as an indicator of interest yield. A negative correlation is expected between interest rates and gold prices as the two are alternative investment instruments.

P (Wholesale Price Index): The values from the Wholesale Price Index were used in the model to represent the general level of prices. During inflationist periods, if the increase in gold prices is higher than inflation rate or than the increase rate of overall price level, people tend to invest a part of their income in gold and make speculative earnings to avoid the negative impact of inflation (Alıç, 1985: 44).

BP (Brent Oil Prices): In our model, we used the Brent Oil value in US dollars, the oil price that is most commonly accepted and used in European markets. OPEC member countries use gold prices as an indicator when determining oil prices. In practice, gold and oil prices tend to determine and influence one another (Aslan, 1999: 23). It is

expected that oil prices will move in the same direction as gold prices (Aziz, 1999: 38).
LGP (London Bullion Market Association Gold Price): Nominal selling price in US dollars of 1 ounce (31.1 grams) of gold in London Bullion Market Association at 12.30 in Turkish time. This so-called London market gold fixing price is globally recognized as a reference price. Istanbul Gold Exchange takes account of the prices of London Bullion Market Association when determining the price of gold. The strongest determinant of gold prices in Turkey is believed to be the gold prices international markets. As it is well known, like any asset that is an object of commerce in international markets, gold interacts with other markets around the world in the process of pricing (Menase, 2009: 151). Therefore, a positive correlation is expected between the two variables.
ISE (Istanbul Stock Exchange 100 Index): Since the ISE-100 index and the more recent BİST 100 index are alternative investment instruments, a negative correlation is expected with gold prices.

3.1. Stationary Analysis and Estimation of Models

Prior to estimation process, one needs to determine the variables' stationarity or integration levels. ADF (Augmented Dickey-Fuller) test was used for this purpose. Table 1 shows the results of the ADF test.

Table 1. Results of the ADF Test

Variables	Level	First-Order Difference
LGP	1.43 *	-12.88**
P	-1.97*	-3.95**
IST	1.49*	-13.11**
DJ	-2.62*	-13.55**
USD	-2.62*	-10.16**
BP	-1.00*	-14.36**
R	-2.18*	-14.59**
ISE	-2.50*	-10.09**

** Rejection of the unit root hypothesis at the 1% level.

As seen in Table 1, all the variables are first-order difference stationary. Since all the variables used in the model are I(1) or first-order difference stationary, the following model was estimated using the Engle-Granger two-step estimation procedure.

$$IST_t=\alpha_0 + \alpha_1 DJ_t + \alpha_2 USD_t + \alpha_3 ISE_t + \alpha_4 R_t + \alpha_5 BP_t + \alpha_6 P_t + \alpha_7 LGP_t + u_t \quad (4)$$

The estimation results are given in Table 2.

Table 2. Results of Engle-Granger Two-Step Estimation

Variables	Coefficients	t statistics	Prob.
C	-0.0454	-0.6483	0.5175
DJ	0.0046	0.6078	0.5440
USD	-0.0056	-0.8985	0.3700
ISE	-0.0022	-0.7195	0.4727
R	-1.24E-06	-0.0344	0.9726
BP	0.0063	1.7026	0.0902
P	0.0085	1.2557	0.2107
LGP	1.0001	296.633	0.000
R^2=0.99	F=97024.51	U_{ADF}=-11.22 Prob(0.000)	
$F_{WHİTE}$=1.44 Prob(0.0658)		ARCH=7.40 Prob(0.0071)	
BG-LM=5.7011 Prob(0.0039)		DW=1.53	

As seen in Table 2, except for the London Bullion Market Association's gold prices (LGP) and Brent oil prices (BP), all the variables have coefficients whose signs match the economic expectations, but are statistically insignificant. The model is fully meaningful and has a high explanatory power, but has the ARCH effect. Although the macroeconomic variables used in the model had been expected to influence gold prices, the coefficients were found to be insignificant; so two other models were also tested. In the first of these models, London Bullion Market Association's gold prices were excluded as a variable and the model was estimated using the remaining macroeconomic variables. In the second model, on the other hand, all the macroeconomic variables were excluded and only London Bullion Market Association's gold prices as a variable remained in the model. Engle-Granger two-step estimation procedure was applied to both models and the estimation results are given in Table 3.

Table 3. The Results of Engle-Granger Two-Step Estimation

Variables	Coefficients	t statistics	Prob.	Variables	Coefficients	t statistics	Prob.
C	4.94	3.4195	0.00008	C	0.017	2.2744	0.024
DJ	-0.5081	-3.2305	0.0014	LGP	0.997	826.270	0.000
USD	-1.0187	-8.9924	0.0000				
ISE	0.0827	1.2617	0.2085				
R	-0.0016	-2.1281	0.0346				
BP	0.4265	5.9026	0.0000				
P	0.9832	7.7612	0.0000				
R^2=0.86	F=218.41	U_{ADF}=-2.45	Prob (0.014)	R^2=0.99	F=682723.4	U_{ADF}=-10.98	Prob (0.00)
F_{WHITE}=6.74 Prob(0.000)				F_{WHITE}=0.25 Prob(0.7748)			
ARCH=540.77 Prob(0.000)				ARCH=7.68 Prob(0.061)			
BG-LM=593.28 Prob(0.000)				DW=1.50			
DW=0.146							

As is clear from Table 3, when London Bullion Market Association's gold prices were excluded from the model as a variable, the coefficients of all macroeconomic variables except for the ISE 100 index produced statistically significant results and the coefficients matched the economic expectations. However, autocorrelation and ARCH effect were observed when London Bullion Market Association's gold prices were excluded from the model. On the other hand, when only London Bullion Market Association's gold prices were included in the model, the autocorrelation problem in particular was not observed. Therefore, it was concluded that London Bullion Market Association's gold prices constitute the most important variable that influences the gold prices in the İstanbul Gold Exchange. Its coefficient also matched the expectations.

Several similar studies have been conducted in the literature. In one of these, Smith (2002) did not find a significant correlation between gold prices and stock market indices in the long run. Toraman (2011), Vural (2003), Ghost (2002) and Öztürk (2008) observed significant correlations between gold prices and macroeconomic variables. Menase (2009) concluded that the most important variable with impact on gold prices is the gold prices in London stock market.

Since ARCH effect was observed in all of the three models estimated, autoregressive conditional heteroscedasticity models (ARCH, GARCH ve EGARCH) were employed. To this end, ARCH, GARCH, and EGARCH models were tested in order to find out the monthly return volatility rate of the gold prices in the Istanbul Gold Exchange.

The conversion suitable for the return rate for the monthly weighted average İstanbul Gold Exchange gold price series was calculated using the $R_t = \ln\left(\frac{İST_t}{İST_{t-1}}\right)$ formula by taking the logarithmic first differences. This procedure will not only ensure stationarity for the series, but the series' return rate will also be obtained on a monthly basis (Gökçe, 1998: 87-88). R_t: the return rate in month t.

Table 4 shows the ARMA models concerning different lag lengths fort he monthly returns (R_t) of the İstanbul Gold Exchange gold prices.

Table 4. Suitable ARMA Models

	Variables	Coefficients	t statistics	Prob.
ARMA(1,3)	Constant Term	0.014503	5.298634	0.0000
	AR(1)	0.974460	100.9779	0.0000
	MA(1)	-0.962114	-13.45378	0.0000
	MA(2)	-0.169620	-1.739834	0.0834
	MA(3)	0.142193	2.003919	0.0464
	Log-Probability Value:382.0465			
	AIC: -3.733134	SC: -3.651246		
ARMA(2,2)	Constant Term	0.007171	2.667022	0.0083
	AR(1)	-0.415027	-2.915774	0.0040
	AR(2)	-0.856584	-6.406286	0.0000
	MA(1)	0.463377	2.840569	0.0050
	MA(2)	0.804319	5.256284	0.0000
	Log-Probability Value:373.4875			
	AIC: -3.666542	SC: -3.584370		
ARMA(3,1)	Constant Term	0.014410	5.534122	0.0000
	AR(1)	1.003210	14.10880	0.0000
	AR(2)	-0.184300	-1.840801	0.0672
	AR(3)	0.151068	2.158881	0.0321
	MA(1)	-0.988433	-161.6907	0.0000
	Log-Probability Value:377.5704			

AIC: -3.725704	SC: -3.643247

It is seen in Table 4 that all the coefficients in the ARMA (1,3), ARMA (2,2), and ARMA (3,1) models are significant. But the best model is the ARMA(1,3) model with the values ($AIC: -3.733134$ and $SC: -3.651246$, where AIC and SC criteria are the lowest.

In order to investigate the presence of any ARCH effect in the ARMA(1,3) model, which was found to be suitable for the Istanbul Gold Exchange gold prices monthly return series, an ARCH–LM test was applied.

Table 5. Results of the ARCH-LM Test

ARCH-LM	$n * R^2$	Prob.
	4.796809	0.0297

As shown by the ARCH–LM test results in Table 5, the LM test is lower than the α=0.05 significance level, so the ARCH effect is observed in the error squares of the ARMA (1,3) model. Due to the presence of the ARCH effect in the Istanbul Gold Exchange gold prices monthly return series, it was concluded that volatility for the series could be modeled using ARCH-type models.

Once ARCH effect is identified in a model, the model needs to be estimated using suitable ARCH models. After the ARCH effect was found in the series, the researcher estimated all autocorrelation heteroscedasticity models that could remove this effect from the series and show the variance trends in the best way.

$H_0: \alpha_1 = \alpha_2 = \cdots = \alpha_q$ *There is no ARCH effect.*

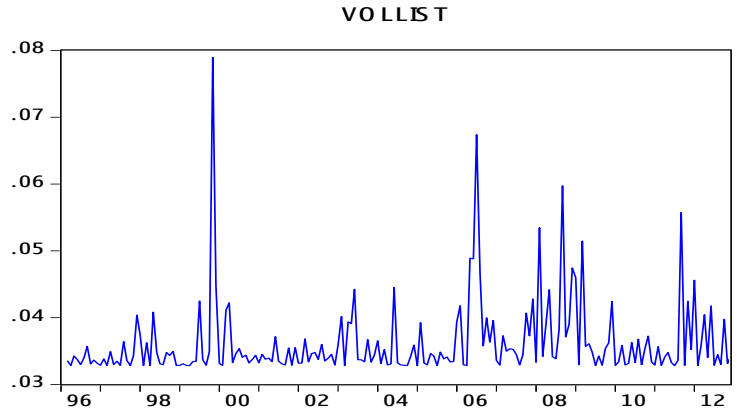
H_1: At least one is different from zero. *ARCH effect exists.*

Table 6. Results of Suitable Models

	ARCH (1)	Prob.
Constant Term	0.014268	0.0000
AR(1)	0.975637	0.0000
MA(1)	−0.914141	0.0000
MA(2)	−0.209294	0.0327
MA(3)	0.134158	0.0315
α_0	0.001076	0.0000
α_1	0.200566	0.0809
AIC	−3.749797	
SC	−3.635154	
Log- Probability	385.7295	

As seen in Table 6, volatility modeling for the Istanbul Gold Exchange monthly return series was continued with the ARCH (1…9), GARCH [(1,1)…(9,9)] , EGARCH [(1,1) …(9,9)] options. Yet, as a result of the tests, only the ARCH (1) model parameters were found to be statistically significant at a significance level of $\alpha = 0{,}05$. The model parameters α_0 and α_1 fulfill the ARCH constraints as being positive and smaller than 1. The values obtained from the ARCH(1) model for the Istanbul Gold Exchange gold prices monthly return series were named as the VOL(LIST) variable.

VOL(LIST): Volatility of the monthly return series obtained for 1 ounce of gold in the Istanbul Gold Exchange in US dollars.



Graph 1. Monthly Trend of the Istanbul Gold Exchange Monthly Return Volatility Series for the Period between 1996.01 and 2012-12

Based on the İstanbul Gold Exchange data given in Graph 1, one could speak of a constant change in the series after 1999. For 1999 and 2000, responses to the economic crises in Turkey are obvious. In addition to the responses to the crises in Turkey, similar changes are also observed during the 2008 international Mortgage crisis.

In addition to the Istanbul Gold Exchange gold prices, London Bullion Market Association's gold prices, Brent oil prices, US dollar, American Dow Jones Industrial Index, monthly average time deposit interest rates, Wholesale Price Index, and Istanbul Stock Exchange 100 Index, the VOL (LİST) variable was also included and various ARCH, GARCH, and EGARCH models were applied. The analysis results revealed that EGARCH (1,1) provided the best model. The estimation results are given in Table 7.

Table 7. Model Estimation Results

	EGARCH (1,1)	Prob.
C	0.079995	0.0000
LGP	0.994504	0.0000
DJ	−0.005260	0.0005
P	0.003167	0.0000
VOL(LİST)	−0.169258	0.0003
α_0	−7.022406	0.0000
δ_1	1.226106	0.0000
γ_1	−0.793757	0.0000
β_1	0.376049	0.0000
R^2	0.999696	
F	75365.95	0.0000
AIC	−6.633044	
SC	−6.485646	
Log- Probability	678.9374	
F_{white}=1.1467 Prob(0.32)	ARCH-LM(1lag)=0.2370 Prob(0.6269)	
ARCH-LM(3lag)=0.1588 Prob(0.9238)	ARCH-LM(8lag)=0.1759 Prob(0.9939)	

On the basis of the results in Table 7, parameters of the EGARCH(1,1) model are statistically significant at a significance level of $\alpha = 0{,}05$.

EGARCH(1,1) overall model;

$$lnh_t = \alpha_0 + \delta_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \gamma_1 \left(\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + \beta_1 \ln(h_{t-1})$$

EGARCH(1,1) estimation model;

$$lnh_t = -7.022406 + 1.226106 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| - 0.793757 \left(\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + 0.376049 \ln(h_{t-1}) \quad (5)$$

The γ_1 parameter, which is different from 0, indicates the presence of an asymmetrical effect in the model. Negative news influences the market to a greater extent. The parameters α_0, δ_1, γ_1 and β_1 in the model are

statistically significant, which points to the leverage effect in volatility.

These results support the argument that volatility in financial markets respond to shocks asymmetrically and that negative shocks have stronger influence upon variance.

There are similar studies on the subject in the literature. Erer (2011) examined the changes in gold prices in Turkish gold market and modeled the volatility in the gold market. Demireli and Torun (2009) examined that economic, social and political developments which are believed to influence free market gold prices in Turkey and UK and constructed a CGARCH model. Kutan and Aksoy (2004) looked at the impact of consumer price index upon gold market returns and volatility in Turkish economy.

4. Conclusion and Suggestions

This study aims to identify the factors that influence gold prices in Turkish Gold Exchange. Seven different macroeconomic variables were identified for this purpose. These variables include London Bullion Market Association's gold prices, Brent oil prices, the US dollar, the American Dow Jones Industrial Index, monthly average time deposit interest rates, Wholesale Price Index, and Istanbul Stock Exchange 100 Index. The monthly data between January 1996 and December 2012 were used for the variables. Three different models were estimated by using Engle-Granger two-step estimation procedure. In the model that delivered the best results among all the estimated models, London Bullion Market Association's gold prices were found to be the single and most important variable that influences the gold prices in the Istanbul Gold Exchange. A one percent increase in London Bullion Market Association's gold prices leads to an average increase of 0.99% in the gold prices in the İstanbul Gold Exchange. Nevertheless, all the estimated models demonstrated the ARCH effect. Therefore, autoregressive conditional heteroscedasticity models were employed.

For model estimation, the most commonly known among these models were used; i.e., Autoregressive Conditional Heteroscedasticity (ARCH) model developed by Engle(1982); Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model formed by Bollerslev (1986), who elaborated the abovementioned model; and the EGARCH model developed by Nelson (1991).

The results of the analyses demonstrated that the EGARCH(1,1) model was the most successful among all the models used according to the Akaike and Schwartz information criteria. The ARCH–LM and White tests revealed that the heteroscedasticity problem had been eliminated, the ARCH effect was removed, and there was no autocorrelation among the error squares. The results of the EGARCH(1,1) model showed that London Bullion Market Association's gold prices, the American Dow Jones Industrial Index, Wholesale Price Index, and the volatility of monthly average gold prices in the Istanbul Gold Exchange are the variables that influence the gold prices in the Istanbul Gold Exchange.

To conclude, it was observed that gold market is influenced by the shocks in the economy and such shocks lead to volatility. The shocks and surprising news in the past were seen to influence volatility in the future. Therefore, the required environment of trust should be created and information channels should be open to all investors so that volatility can maintain a stable course.

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